

REMARKS

Applicants have amended their specification in order to correct typographical and grammatical errors, and to provide a new title as suggested by the Examiner; and have provided a new Abstract which is a single paragraph. In view of the amendments to the specification, objections in Items [6] and [7] on page 3 of the Office Action mailed November 24, 2009, are moot.

Applicants are providing a marked-up copy of the Substitute Specification submitted July 28, 2006, obviating the objection in Item [8] on page 3 of the Office Action mailed November 24, 2009.

Applicants have amended their claims in order to further clarify the definition of various aspects of the present invention. Specifically, Applicants have amended claims 1, 2, 5 and 6, the claims previously considered on the merits in the above-identified application, to recite an “isolated” polypeptide. Applicants have further amended claims 1 and 5 to set forth the proper description for the abbreviations in line 1 of these claims; have further amended these claims to recite a polypeptide comprising “the” amino acid sequence with the specified sequence listings; and have also amended these claims to recite that the polypeptide comprises the amino acid sequence with the substitution, deletion, insertion, addition or inversion of “one to five” amino acids in the amino acid sequence shown in the specified sequence listing. Claims 1 and 5 have also been amended to delete recitation of the polypeptide NBS.

In connection with amendments to previously considered claims, note, for example, pages 5-7, 16, 18 and 19 of Applicants’ Substitute Specification.

Moreover, Applicants are adding new claims 34 and 35 to the application.

Claims 34 and 35, dependent respectively on claims 1 and 5, recites that the isolated polypeptide comprises the amino acid sequence shown in SEQ ID NO:2 in the sequence listing, and comprises the amino acid sequence shown in SEQ ID NO:3 in the sequence listing, respectively.

The claim objections in Items [9]-[11] on page 3 of the Office Action mailed November 24, 2009, are noted. Applicants have provided a phrase corresponding to the abbreviations, in claims 1 and 5, whereby the basis for the objection in Item [9] is moot. Applicants have amended claims 1 and 5 to correct the sequence identifiers, and have deleted the phrase objected to in claim 5, whereby bases for claim objections in Items [10] and [11] on page 3 of the Office Action mailed November 24, 2009, are moot.

Applicants respectfully traverse the rejection of their claims under the second paragraph of 35 USC 112, especially insofar as applicable to the claims as presently amended. Thus, claims 1 and 5 delete the expression “the neoculin dimer”; accordingly, basis for rejection of claims in that there is insufficient antecedent basis for this phrase is moot. Moreover, in light of deletions of recitations from claims 1 and 5, it is respectfully submitted that bases for rejection of the claims as indefinite, set forth in Items [12](b) and (c), are moot.

It is respectfully submitted that the rejection of claims under 35 USC 101 in Item [13] on page 5 of the Office Action mailed November 24, 2009, is moot, in light of claim amendments to recite an “isolated” polypeptide.

Claims 1 and 5 have been amended to recite that the isolated polypeptide is that shown in (A) or (B), deleting recitation that the polypeptide can form the neoculin

dimer together with a polypeptide NBS shown in (a) or (b), claims 1 and 5 respectively also being amended to recite the amino acid sequence shown in SEQ ID NO:2 and SEQ ID NO:3. In view of these amendments, including use of the definite article "the" and deletion of recitation of the neoculin dimer, it is respectfully submitted that the basis for rejection of claims under the first paragraph of 35 USC 112, set forth in Item [14] on pages 5-9 of the Office Action mailed November 24, 2009, is moot.

Applicants respectfully traverse the rejection of their claims under the first paragraph of 35 USC 112, as set forth Item [15] on pages 9-14 of the Office Action mailed November 24, 2009, insofar as this rejection is applicable to the claims as presently amended. Thus, it is noted that claim 1 has have been amended to recite that the polypeptide comprises "the" amino acid sequence shown in SEQ ID NO:2 in the sequence listing, or a peptide comprising the amino acid sequence with substitution, deletion, insertion, addition or inversion of 1-5 amino acids in this amino acid sequence, and claim 5 has been amended to recite that the polypeptide comprises the amino acid sequence shown in SEQ ID NO:3, or a polypeptide including the amino acid sequence with substitution, deletion, insertion, addition or inversion of 1-5 amino acids in this amino acid sequence. It is respectfully submitted that Applicants' disclosure would have been enabling for one of ordinary skill in the art to have made and used the invention as presently claimed, as of the relevant date.

The analysis by the Examiner of the breadth of the claims, on pages 10 and 11 of the Office Action mailed November 24, 2009, is noted. As can be appreciated, claims 1 and 5 have been amended to further define (A) and (B), and to

delete recitation of the neoculin dimer. In view of the claims as presently amended, and particularly noting the Examples starting from page 31 of Applicants' Substitute Specification, it is respectfully submitted that sufficient guidance is provided to one of ordinary skill in the art to make and use the invention as presently claimed.

Applicants respectfully submit that all of the claims presented for consideration on the merits by the Examiner patentably distinguish over the teachings of the references applied by the Examiner in rejecting claims in the Office Action mailed November 24, 2009, that is, the teachings of the articles by Yamashita, et al., "Purification and Complete Amino Acid Sequence of a New Type of Sweet Protein with Taste-modifying Activity, Curculin**", in The Journal of Biological Chemistry, Vol. 265, No. 26, issue of September 15, 1990, pp. 15770-15775; Shirasuka, et al., "Neoculin as a New Taste-modifying Protein Occurring in the Fruit of *Curculigo latifolia*", in Biosci. Biotechnol. Biochem., 68 (6), (2004), pp. 1403-1407; Shimizu-Ibuka, et al., "Crystal Structure of Neoculin: Insights into its Sweetness and Taste-modifying Activity", in J. Mol. Biol., (2006), 359, pp. 145-158; and Suzuki, et al., "Recombinant curculin heterodimer exhibits taste-modifying and sweet-tasting activities", in FEBS LETTERS, 573, (2004), pp. 135-138, under the provisions of 35 USC 102 and 35 USC 103.

Initially, it is noted that Shimizu-Ibuka, et al. has a copyright date in 2006; and while each of Shirasuka, et al. and Suzuki, et al. are dated in 2004, Suzuki, et al. was available online on August 9, 2004 (received June 21, 2004, revised July 9, 2004 and accepted July 12, 2004) and Shirasuka, et al. was received April 14, 2004 and accepted April 22, 2004. Thus, clearly the dates for purposes of prior art, for each of Suzuki, et al., Shirasuka, et al. and Shimizu-Ibuka, et al. were after the filing

date of the Japanese priority application for the above-identified application, priority thereof being claimed under 35 USC 119. As acknowledged by the Examiner in the Office Action mailed November 24, 2009, a claim for foreign priority under 35 USC 119 has been made, and copies of the certified copies of the priority documents have been received in the above-identified National Stage application from the International Bureau.

Moreover, for completing procedural requirements of 37 CFR 1.55, enclosed please find an English translation of the Japanese priority application for the above-identified application, that is, Japanese Patent Application No. 2004-019251, filed on January 28, 2004. Attached to this English translation is a Declaration as to accuracy of the translation. As can be seen in the enclosed English translation, on pages 4-6, 12 and 14-17 thereof, it is clear that the Japanese priority application for the above-identified application satisfies requirements of the first paragraph of 35 USC 112, in connection with the subject matter of the claims being considered on the merits in the above-identified application. Accordingly, Applicants are to be accorded benefit of a filing date of January 28, 2004; and, thus, none of Suzuki, et al., Shirasuka, et al. and Shimizu-Ibuka, et al. constitutes prior art in connection with the above-identified application. Accordingly, the "prior art" rejection set forth in Item [16] on pages 14 and 15 of the Office Action mailed November 24, 2009 is improper, in that the references upon which the rejection is based do not constitute prior art. Thus, no further discussion of this rejection is necessary.

As for the rejection set forth in Item [17] on pages 16 and 17 of the Office Action mailed November 24, 2009, it is again noted that Suzuki, et al. and Shimizu-

Ibuka, et al. do not constitute prior art; and, for this reason alone, it is respectfully submitted that the prior art rejection is improper.

In any event, it is respectfully submitted that the teachings of Yamashita, et al., applied by the Examiner, would have neither disclosed nor would have suggested the presently claimed isolated polypeptide as in claims 1, 2, 34 and 35, comprising the amino acid sequence shown in SEQ ID NO:2 in the sequence listing, per se, or with the substitution, deletion, insertion, addition or inversion of 1 to 5 amino acids in this amino acid sequence; or comprising the amino acid sequence shown in SEQ ID NO:3 in the sequence listing, per se, or with the substitution, deletion, insertion, addition or inversion of 1 to 5 amino acids in this amino acid sequence.

Furthermore, it is respectfully submitted that Yamashita, et al. would have neither disclosed nor would have suggested such isolated polypeptide as in claims 1 and 5, which is glycosylated with an N-linked sugar chain comprising mannose/N-acetylglucosamine/fucose/xylose at a ratio of 3/3/1/1. Note claims 2 and 6.

The invention as being considered on the merits in the above-identified application is directed to an isolated polypeptide neoculin acidic subunit or precursor thereof. Such isolated polypeptide has a taste-modifying activity, to give a substance a sweet taste.

The present inventors have found that neoculin greatly reduced the sourness, bitterness or astringency of foods and drinks, and additionally that neoculin has an activity to enhance the taste of foods and drinks, namely, a taste-modifying activity. The present inventors have found that neoculin has a far better taste-modifying

action than that of curculin, and is highly practically applicable. Note, e.g., pages 4 and 5 of Applicants' Substitute Specification.

As to advantages achieved by the present invention, note comparison of the taste-modifying activities of neoculin and curculin, set forth in Example 10 on pages 47-49 of Applicants' Substitute Specification. As can be seen particularly in Table 5 on page 49, and as discussed under this table, the taste-modifying activity of neoculin was far stronger than the taste-modifying activity of curculin.

Yamashita, et al. reports on a study in which a new type of protein which elicits a sweet taste and also has taste-modifying activities has been found, this protein having been isolated from the fruits of *Curculigo latifolia*, this plant being a stemless herb which grows wild in western Malaysia. This study indicates that the active principal has been purified, and named curculin, and the article reports on the complete amino acid sequence of curculin, which is a dimer of a polypeptide with 114 residues. Note the first two paragraphs in the right-hand column on page 15770.

It is emphasized that this article discloses and identifies curculin. It is respectfully submitted that the teachings of this reference do not disclose, nor would have suggested, the isolated polypeptide neoculin acidic subunit or precursor thereof as in the claims presently being considered on the merits, much less advantage thereof as seen, for example, in Example 10 of Applicants' disclosure, discussed previously.

The contention by the Examiner in the paragraph bridging pages 16 and 17 of the Office Action mailed November 24, 2009, that the curculin of Yamashita, et al. "comprises a polypeptide encompassed by claims 1-2 and 5-6" is respectfully

traversed. In connection therewith, attention is respectfully directed to the enclosed Table comparing amino acid sequences between neoculin and curculin. It is respectfully submitted that 29 amino acids are acknowledged to be different in the amino acid sequence of curculin disclosed in Yamashita, et al., as compared with PNAS shown in SEQ ID NO:2 and PNAS shown in SEQ ID NO:3 of the above-identified application. It is respectfully submitted that this indicates that 25.4% of the amino acid sequence is different in terms of total peptide of curculin disclosed in Yamashita, et al.

In contrast, the amended present claim 1 encompasses amino acid sequences ranging from the amino acid sequence shown in SEQ ID NO:2 to an amino acid sequence with mutation of up to five amino acids. That is, amino acid sequences ranging from the amino acid sequence shown in SEQ ID NO:2 to a peptide with 4.4% amino acid mutation. Similarly, the amended present claim 5 encompasses amino acid sequences ranging from amino acid sequence shown in SEQ ID NO:3 to an amino acid sequence with mutation of up to five amino acids. That is, amino acid sequences ranging from an amino acid sequence shown in SEQ ID NO:3 to a peptide with 3.5% amino acid mutation.

As can be seen in the foregoing, polypeptides encompassed by the presently amended claims 1 and 5 have an amino acid sequence completely different from that of curculin disclosed in Yamashita, et al., and it is respectfully submitted that the teachings of this reference would have neither disclosed nor would have suggested polypeptides according to the present claims, especially in light of advantages thereof as shown in Example 10 of Applicants' disclosure as discussed previously.

In view of the foregoing comments and amendments, reconsideration and allowance of all claims being considered on the merits in the above-identified application are respectfully requested.

Applicants request any shortage of fees due in connection with the filing of this paper be charged to the Deposit Account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (case 1333.46425X00), and please credit any excess fees to such Deposit Account.

Respectfully submitted,

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Enclosures: Substitute Abstract (p. 80); English Translation of JP 2004-019251 w/Statement of Accuracy; Table; Marked-up copy for Substitute Specification filed July 28, 2006

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